

Election/Restrictions

Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) **1-11 and 15**, drawn to a method of forming a gold layer having a biaxial texturing on a substrate.

Group II, claim(s) **12-14**, drawn to a method of making a superconducting article.

Group III, claim(s) **16-23**, drawn to a biaxially textured, superconducting article for use in electronic devices.

Group IV, claim(s) **24-28**, drawn to a superconducting article.

The inventions listed as Groups I-IV do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

The method of Group I lacks the special technical feature of depositing a superconducting layer onto the gold layer such that biaxial texturing of the gold layer is maintained in the superconducting layer as recited in the method of Group II.

The article of Group III lacks the special technical feature of a superconducting material having biaxial texturing deposited onto the gold layer as recited in the article of Group IV.

The method of Group I does not make the article recited in Group IV.

The method of Group II does not make the article recited in Group III.

During a telephone conversation with Paul J. White on August 11, 2008 a provisional election was made with traverse to prosecute the invention of Group I, claims **1-11 and 15**. Affirmation of this election must be made by applicant in replying to this Office action. Claims **12-14 and 16-28** are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Drawings

Figure 2 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Applicants' specification discloses that "Figure 2 is a theta-2-theta scan of gold electrodeposited onto a nickel substrate by conventional electrodeposition" (page 4, lines 17-18).

Specification

The disclosure is objected to because of the following informalities:

page 6, lines 16-17, reference characters "14" and "12" have both been used to designate the gold buffer layer. See also page 6, line 28; and page 7, lines 3, 5 and 10.

Appropriate correction is required.

The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Objections

Claim 2 is objected to because of the following informalities:

Claim 2

line 2, "mA/cm²for" should be amended to -- mA/cm² for --.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

Claims 2-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2

line 1, it appears that the word "including" is further limiting "the method comprising" recited in claim 1, lines 1-2. However, the claim language is unclear as to whether it is. If it is, then it is suggested that the word "including" be amended to the words -- further comprising --.

line 1, it appears that the "electrodepositing" is the same as the electrodepositing recited in claim 1, line 2. However, the claim language is unclear as to whether it is.

lines 1-2, it appears that "a current density of between about 0.10 and 3.5 mA/cm² for between about 1 and 60 minutes" is further limiting the current density of less than about 5.0 mA/cm² for at least about 1 minute recited in claim 1, lines 2-3.

However, the claim language is unclear as to whether it is.

Claim 3

line 1, it appears that the word "including" is further limiting "the method comprising" recited in claim 1, lines 1-2. However, the claim language is unclear as to whether it is. If it is, then it is suggested that the word "including" be amended to the words -- further comprising --.

line 1, it appears that the "electrodepositing" is the same as the electrodepositing recited in claim 1, line 2. However, the claim language is unclear as to whether it is.

lines 1-2, it appears that "a current density of between about 0.13 and 0.30 mA/cm² for between about 30 and 60 minutes" is further limiting the current density of less than about 5.0 mA/cm² for at least about 1 minute recited in claim 1, lines 2-3. However, the claim language is unclear as to whether it is.

Claim 4

line 1, it appears that the word "including" is further limiting "the method comprising" recited in claim 1, lines 1-2. However, the claim language is unclear as to whether it is. If it is, then it is suggested that the word "including" be amended to the words -- further comprising --.

line 1, it appears that the "electrodepositing" is the same as the electrodepositing recited in claim 1, line 2. However, the claim language is unclear as to whether it is.

lines 1-2, it appears that "a current density of about 0.13 for between about 45 and 60 minutes" is further limiting the current density of less than about 5.0 mA/cm² for at least about 1 minute recited in claim 1, lines 2-3. However, the claim language is unclear as to whether it is.

Claim 5

line 1, it appears that the word "including" is further limiting "the method comprising" recited in claim 1, lines 1-2. However, the claim language is unclear as to whether it is. If it is, then it is suggested that the word "including" be amended to the words -- further comprising --.

lines 1-2, it appears that "the gold layer" is the same as the gold recited in claim 1, line 2. However, the claim language is unclear as to whether it is. If it is not, then the gold layer is further limiting the gold layer recited in the preamble of the claim 1 and not the gold recited in the method step in the body of the claim 1. See also claim 6, lines 1 and 3; and claim 7, lines 1-2.

Claim 6

line 1, it appears that the word “including” is further limiting “The method of claim 1 including” recited in claim 5, line 1. However, the claim language is unclear as to whether it is.

line 1, it appears that the “annealing” is the same as the annealing recited in claim 5, line 1. However, the claim language is unclear as to whether it is. If it is, then it is suggested that the word -- the -- be inserted before the word “annealing”.

Claim 7

line 1, it appears that the word “including” is further limiting “The method of claim 1 including” recited in claim 5, line 1. However, the claim language is unclear as to whether it is.

line 1, it appears that the “annealing” is the same as the annealing recited in claim 5, line 1. However, the claim language is unclear as to whether it is. If it is, then it is suggested that the word -- the -- be inserted before the word “annealing”.

Claim 8

line 1, it appears that the word “comprising” is further limiting “the method comprising” recited in claim 1, lines 1-2. However, the claim language is unclear as to

whether it is. If it is, then it is suggested that the word "comprising" be amended to the words -- further comprising --.

line 1, "the metal substrate" lacks antecedent basis. See also claim 9, lines 1-2.

Claim 9

line 1, it appears that the word "including" is further limiting "The method of claim 1 comprising" recited in claim 8, line 1. However, the claim language is unclear as to whether it is.

Claim 10

line 1, it appears that the word "including" is further limiting "The method of claim 1 comprising" recited in claim 8, line 1. However, the claim language is unclear as to whether it is. If it is, then it is suggested that the word "including" be amended to the words -- further comprising --.

line 1, it appears that the "epitaxially depositing" is further limiting the "forming" recited in claim 1, line 1, or the "electrodepositing" recited in claim 1, line 2. However, the claim language is unclear as to whether it is.

line 1, it appears that "the gold layer" is the same as the gold recited in claim 1,

line 2. However, the claim language is unclear as to whether it is. If it is not, then the gold layer is further limiting the gold layer recited in the preamble of the claim 1 and not the gold recited in the method step in the body of the claim 1.

lines 1-2, it appears that "the biaxially textured substrate" is the same as the biaxially textured *metal* substrate recited in claim 8, line 1. However, the claim language is unclear as to whether it is.

Claim 11

line 2, it appears that "the gold layer" is the same as the gold recited in claim 1, line 2. However, the claim language is unclear as to whether it is. If it is not, then the gold layer is further limiting the gold layer recited in the preamble of the claim 1 and not the gold recited in the method step in the body of the claim 1.

Claim Rejections - 35 USC § 102/103

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

I. Claims **1-2, 5 and 8-10** are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Diaz et al.** ("Preparation of Biaxially Cube Textured Ag, Cu-Au and Cu-Au-Ag Films on Cu Substrates for HTS Coated Conductor Applications", *Supercond. Sci. Technol.*, Vol. 14 (2001), pp. 576-582).

Diaz teaches a method of forming a gold layer having biaxial texturing on a substrate, the method comprising:

electrodepositing gold (= electrodeposition of Au thin films) onto a surface of the substrate (= a cubed textured Cu substrate) at a current density of less than about 5.0 mA/cm² (= at different current densities (0.1, 0.3 and 0.5 A/dm²) = 1, 3 and 5 mA/cm²) for at least about 1 minute (= deposited layers of ~1 μm thickness) [page 579, "3.2. Electrodeposition of Au thin films"; and Fig. 4].

The method includes electrodepositing the gold at a current density of between about 0.10 and 3.5 mA/cm² (= at different current densities (0.1, 0.3 and 0.5 A/dm²) = 1, 3 and 5 mA/cm²) for between about 1 and 60 minutes (= deposited layers of ~1 μm thickness) [page 579, "3.2. Electrodeposition of Au thin films"].

The method includes annealing the gold layer to increase the biaxial texturing in the gold layer (= electrodeposited thin films were annealed at different atmospheres and temperatures in order to obtain a good quality biaxial texture) [page

578, left column, lines 42-46].

The method comprises biaxially texturing the metal substrate prior to electrodepositing the gold (= the biaxial texture of a metallic substrate) [page 578, left column, lines 1-23; and page 579, Fig. 4].

The method includes rolling the metal substrate to biaxially texture the metal substrate (=the biaxial texture of a metallic substrate prepared by rolling) [page 578, left column, lines 1-23; and page 579, right column, lines 9-13].

The method includes epitaxially depositing the gold layer on the biaxially textured substrate (= the Au electrodeposition leads to polycrystalline thin films, which are absorbed epitaxially into the cubed textured Cu(100) substrates by diffusion mechanisms at high temperature) [page 581, right column, lines 1-3].

II. Claim 15 is rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over **Diaz et al.** ("Preparation of Biaxially Cube Textured Ag, Cu-Au and Cu-Au-Ag Films on Cu Substrates for HTS Coated Conductor Applications", *Supercond. Sci. Technol.*, Vol. 14 (2001), pp. 576-582).

Diaz teaches a method of depositing a gold layer having biaxial texturing onto a substrate comprising:

electrodepositing gold (= electrodeposition of Au thin films) at a current density of between about 0.10 and 3.5 mA/cm² (= at different current densities (0.1, 0.3 and 0.5 A/dm²) = 1, 3 and 5 mA/cm²) for between about 1 and 60 minutes (= deposited layers of

~1 μm thickness) [page 579, "3.2. Electrodeposition of Au thin films"; and Fig. 4].

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

I. Claims **3-4 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Diaz et al.** ("Preparation of Biaxially Cube Textured Ag, Cu-Au and Cu-Au-Ag Films on Cu Substrates for HTS Coated Conductor Applications", *Supercond. Sci. Technol.*, Vol. 14 (2001), pp. 576-582) as applied to claims 1-2, 5 and 8-10 above.

Diaz is as applied above and incorporated herein.

The method of Diaz differs from the instant invention because Diaz does not disclose the following:

a. Wherein the method includes electrodepositing the gold at a current density of between about 0.13 and 0.30 mA/cm² for between about 30 and 60 minutes, as recited in claim 3.

b. Wherein the method includes electrodepositing the gold at a current density of about 0.13 mA/cm² for between about 45 and 60 minutes, as recited in claim 4.

Diaz teaches depositing layers of ~1 μm thickness of Au at different current

densities (0.1, 0.3 and 0.5 A/dm²) using both acid and basic baths (page 579, "3.2. Electrodeposition of Au thin films"; and Fig. 4).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the current density described by Diaz with wherein the method includes electrodepositing the gold at a current density of between about 0.13 and 0.30 mA/cm²; and wherein the method includes electrodepositing the gold at a current density of about 0.13 mA/cm² because the current density is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation (MPEP § 2144.05(II)(A)).

As to for between about 30 and 60 minutes; and for between about 45 and 60 minutes, the time is result-effective variable and one skilled in the art has the skill to calculate the time that would have determined the success of the desired reaction to occur (MPEP § 2141.03 and § 2144.05(II)(B)).

c. Wherein the method comprises repeating the electrodepositing step to increase the thickness of the gold layer, as recited in claim 11.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the method described by Diaz by repeating the electrodepositing step to increase the thickness of the gold layer because the repetition of steps to provide the same results is well within the skill of one having ordinary skill in the art. The concept of duplication is not patentable. *St. Regis Paper Co. v. Bemis Co. Inc.*, 193 USPQ 8, 11 (7th Cir. 1977). While this decision relates to the duplication of parts, there is no reason why such duplication cannot be extended to a process step

II. Claims **6 and 7** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Diaz et al.** ("Preparation of Biaxially Cube Textured Ag, Cu-Au and Cu-Au-Ag Films on Cu Substrates for HTS Coated Conductor Applications", *Supercond. Sci. Technol.*, Vol. 14 (2001), pp. 576-582) as applied to claims 1-2, 5 and 8-10 above, and further in view of **Kobori et al.** (US Patent No. 6,821,406 B2).

Diaz is as applied above and incorporated herein.

The method of Diaz differs from the instant invention because Diaz does not disclose the following:

a. Wherein the method includes annealing the gold layer in forming gas at between about 500 and 600°C for between about 12 and 60 hours to increase the biaxial texturing in the gold layer, as recited in claim 6.

b. Wherein the method includes annealing the gold layer at about 550°C for about 48 hours to increase the biaxial texturing in the gold layer, as recited in claim 7.

Diaz teaches that the electrodeposited thin films were annealed at different atmospheres and temperatures in order to obtain a good quality biaxial texture (page 578, left column, lines 42-46).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the annealing temperature and time described by Diaz with wherein the method includes annealing the gold layer in forming gas at between about 500 and 600°C for between about 12 and 60 hours; and wherein the method includes annealing the gold layer at about 550°C for about 48 hours because:

(i) Diaz teaches annealing at different atmospheres and temperatures in order to obtain a good quality biaxial texture. Why wouldn't the temperatures and times of the annealing disclosed by Diaz be between about 500 and 600°C for between about 12 and 60 hours since Diaz is doing the same endeavor of obtaining a good quality biaxial texture as presently claimed?

(ii) The annealing temperatures and times are result-effective variables and one having ordinary skill in the art has the skill to calculate the annealing temperatures and times that would have determined the success of the desired reaction to occur, i.e., in order to obtain a good quality biaxial texture (Diaz, page 578, left column, lines 42-46) [MPEP § 2141.03 and § 2144.05(II)(B)].

Kobori teaches annealing at a temperature of 350 to 790° C (col. 2, lines 46-54).

The treatment time of annealing is adjusted appropriately according to the treatment temperature within the above-described range. Typically, the treatment is conducted for 30 to 600 min (col. 3, lines 3-6). The annealing be conducted so as to obtain a structure in which surface gold crystals in the obtained surface-treated product have no less than 30%, in particular, no less than 60% planes with a (1,1,1) orientation. Such (1,1,1) planes provide for closest-packed structure of gold atoms, and when the crystal structure with a content ratio of (1,1,1) planes of no less than a specific value is present on the surface (col. 3, lines 15-25).

(iii) It has been held that changes in temperature, concentration or both, is not a patentable modification; however, such changes may impart patentability to a process if the ranges claimed produce new and unexpected results which are different in kind and not merely in degree from results of the prior art, such ranges are termed "critical" ranges and Applicant has the burden of proving such criticality; even though Applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within capabilities of one skilled in the art; more particularly, where general conditions of the claim are disclosed in the prior art, it is not inventive to discover optimum or workable ranges by routine experimentation. *In re Aller*, 220 F2d 454, 456, 105 USPQ 233, 235 (CCPA 1955) and MPEP § 2144.05.

(iv) As to "increase the biaxial texturing in the gold layer", if the Applicant has a different reason for, or advantage resulting from doing what the prior art relied upon has suggested, it is noted that it is well settled that this is not demonstrative of

nonobviousness. *In re Kronig* 190 USPQ 425, 428 (CCPA 1976); *In re Linter* 173 USPQ 560 (CCPA 1972); the prior art motivation or advantage may be different than that of Applicants while still supporting a conclusion of obviousness. *In re Wiseman* 201 USPQ 658 (CCPA 1979); *Ex parte Obiaya* 227 USPQ 58 (Bd. of App. 1985) and MPEP § 2144.

Citations

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Hirai et al. ("Growth of Gold Plating Film on Various Nickel Substrates", *Hyomen Gijutsu* (1992), Vol. 43, No. 9, pp. 868-872) is cited to teach the effect of the crystal structure of various nickel substrates on the orientation of plated gold films (abstract).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDNA WONG whose telephone number is (571) 272-1349. The examiner can normally be reached on Mon-Fri 7:30 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571) 272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Edna Wong/
Primary Examiner
Art Unit 1795

EW
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